

2 -Development Package Installation Guide

The Development Package Installation Guide was prepared by the technical staff of Innovative Integration.,
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file: VSS\manuals\Installation for Win95 Development Packages\Windows Installation Supplement.doc

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1. Introduction

This document contains complete installation directions for Innovative Integration's Development Packages. Innovative Integration makes DSP products that fall into three basic categories. The installation directions are given below for each target card category:

Product Category	Products	Characteristics
ISA-bus-based	PC31, PC32, PC44, PC50	Installed into a conventional IBM PC 16-bit, ISA-bus expansion slot. Do not support Win95/NT plug and play. Supplied with device driver and DLLs to allow communication with card from within 32-bit host applications.
PCI-bus-based	ADC64, cADC64, M44, PCI32, PCI44	Installed into a high-speed IBM PC 32-bit, PCI-bus expansion slot. Fully support Win95/NT plug and play. Supplied with device driver and DLLs to allow communication with card from within 32-bit host applications.
Stand-alone	SBC31, SBC32	Are not installed in a PC - operate autonomously. PC is used only during program development cycle. Do not support Win95/NT plug and play. Uses operating system's device driver and II DLLs to allow communication with card from within 32-bit host applications.

Table 1: Categories of Innovative's DSP products

The installation flow differs slightly for each category of DSP products. The installation of the hardware and software components listed in the sections below **must** be followed in the order listed below. In some cases, the order of installation is critical and software components may not install or operate properly if the sequence is not followed.

1.1 Development Package Installation

The following diagram outlines the installation flow for the hardware and software components of each of the packages.

The order of installation is similar across board categories for most of the installation process.

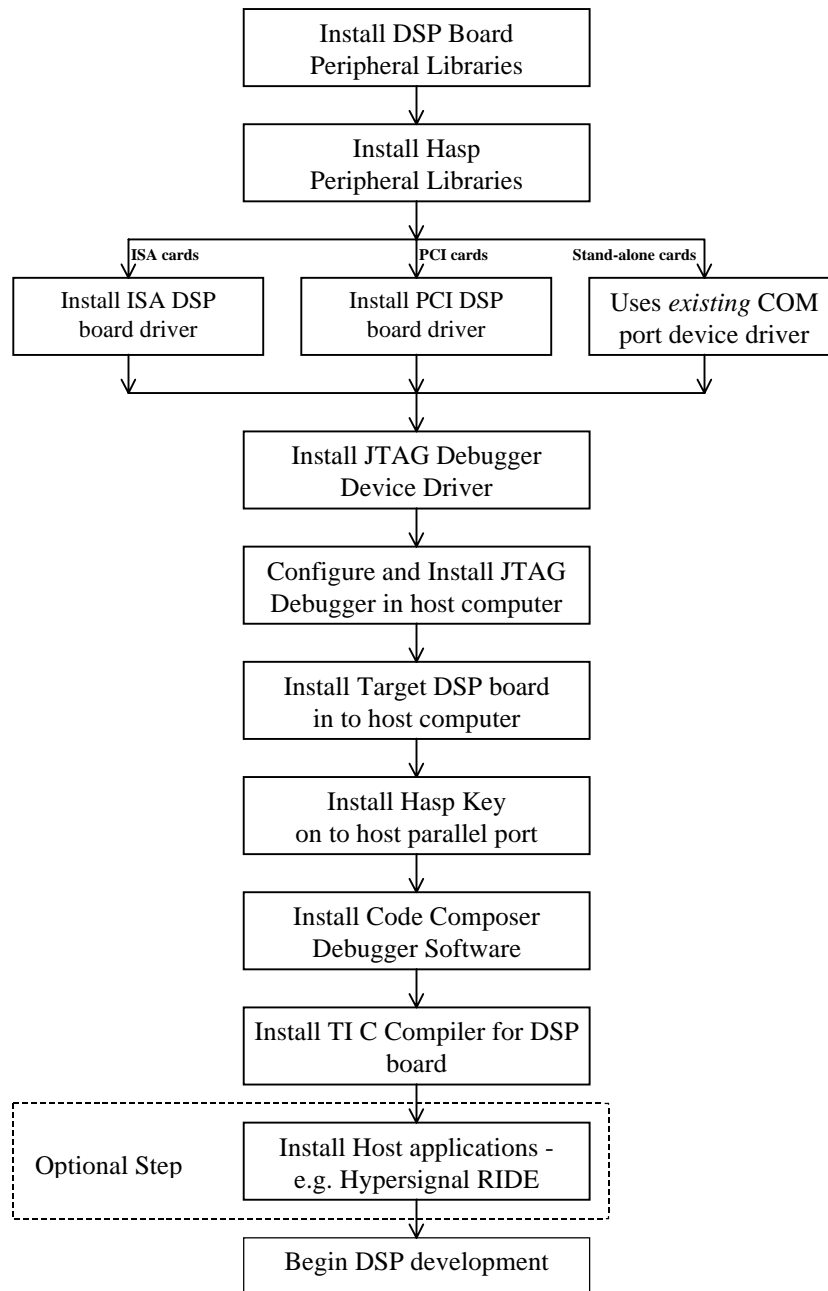


Figure 1: Hardware and Software Installation Flow

2. Software Installation: Part I

Each Development Package consists of software elements developed by Innovative Integration, GO DSP, Texas Instruments, Hyperception and other vendors. This section details the installation of each of the elements of the Development Package.

2.1 Innovative Integration Peripheral Library

The Innovative Integration Peripheral Library is included with the purchase of all Development Packages, and includes example DSP software and a complete set of peripheral control libraries as well as sample host applications and DLL's for use in host code development.

To install the Peripheral Library or Logger software, start the host operating system and insert the installation CD. If the CD does not auto start, click on the <**Start**> button, then <**Run**>. Enter the path to the SETUP.EXE program located at the root of your CD-ROM drive, i.e. **E:\SETUP.EXE**. The setup program will run, starting with a title screen similar to the one below and guide you through installation with a set of prompts:

Once you have selected the correct bus type, ISA, PCI or Stand Alone, you will be prompted to select a specific board.

Important, Microsoft Windows NT Users Please Note: The installation of the NT Device Driver for a Peripheral Library requires the installing user to have Administrator rights on the system. This does not have to be the actual Administrator login, as long as the rights are the same.

Additionally, applications that receive interrupts from a target board must be run by a user with Administrator rights.



After selection is made, you will arrive at the correct board installation area. (see fig 2. examples of the PC31 board installation screen.)

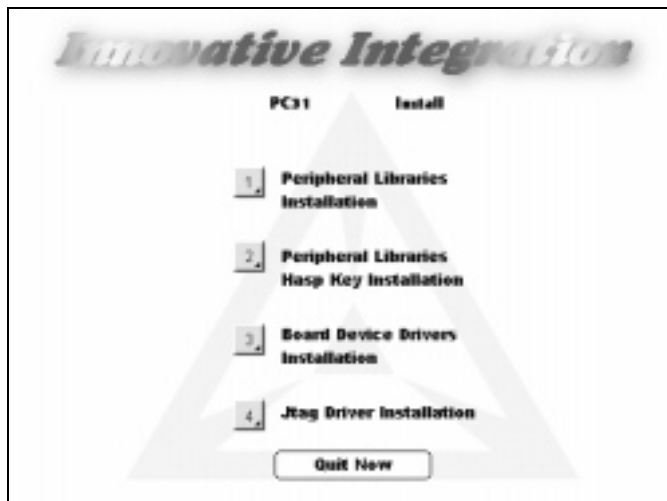
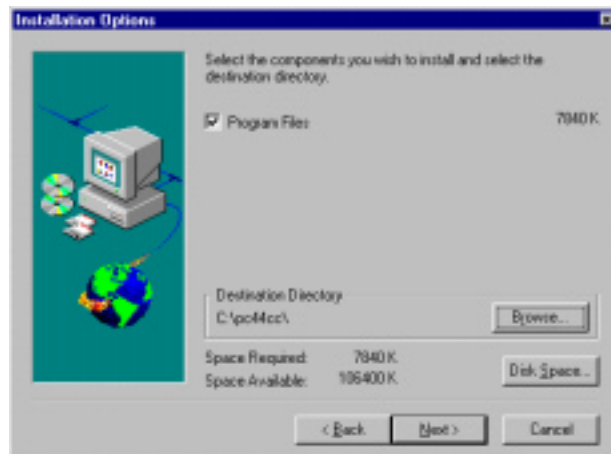


Figure 2: PC31 install screen

1. Select Peripheral Library. InstallShield will be automatically invoked.

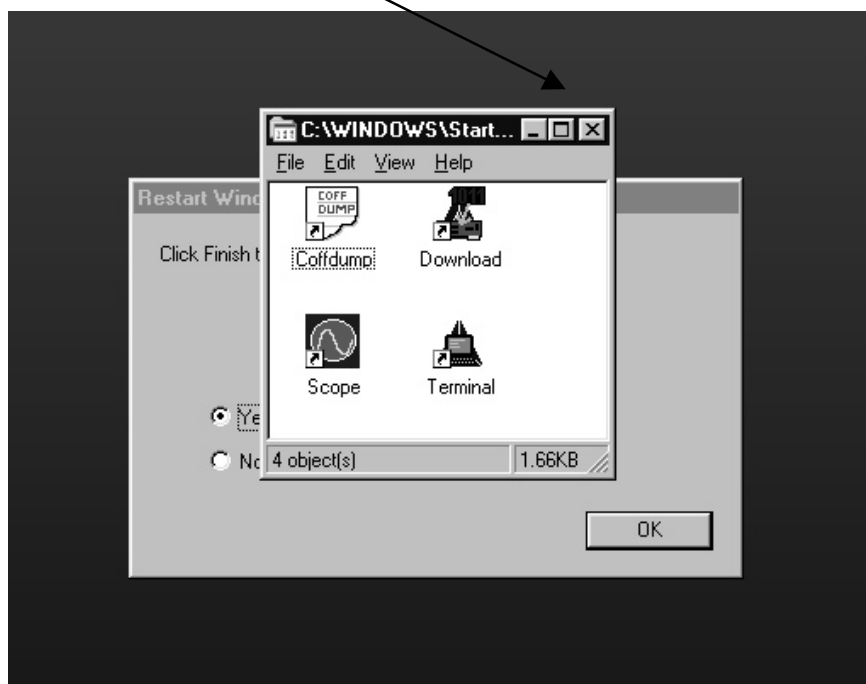


Although any installation drive and path may be specified when installing the Peripheral Library, Innovative Integration highly recommends that the default installation drive and directory be used whenever possible. The Code Composer workspace files for the sample DSP applications have been setup with the default directory paths in mind. If an alternate drive or directory is used, the workspace project setups will need to be changed to reflect the new path. See the Code Composer documentation for more details on the use of projects and workspaces.

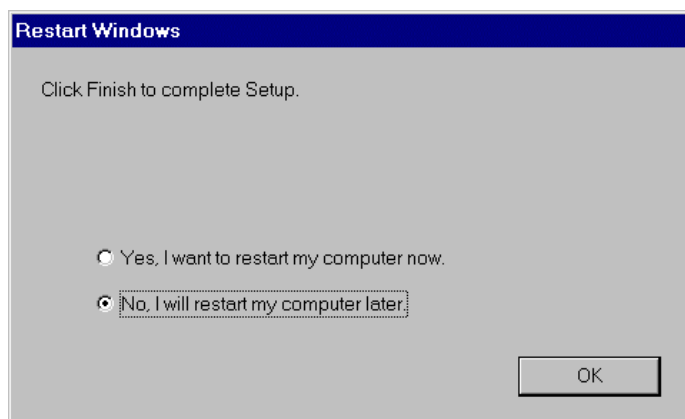


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Next, InstallShield will open a program group window. It needs to be closed. Simply click on the "X" box in the upper right corner to close.

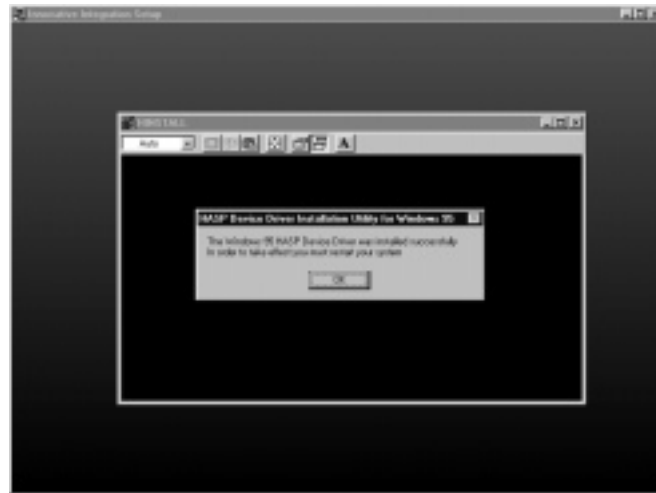


Next, InstallShield will ask if you would like to restart. Select **<No, I will restart my computer later>**, and begin the Hasp Key installation.

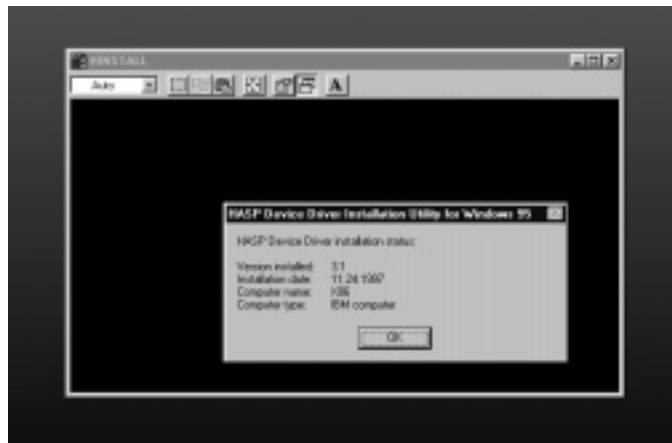


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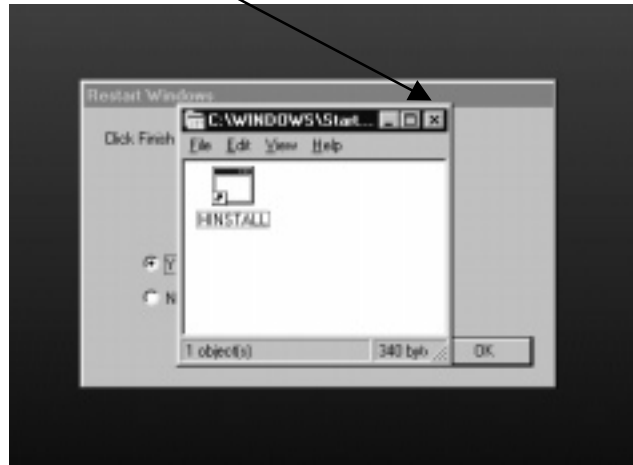
Upon completion, InstallShield will show this screen. It is simply to tell you that your computer must be restarted before any changes made will take effect. Click the "OK" button, it will NOT restart your computer.



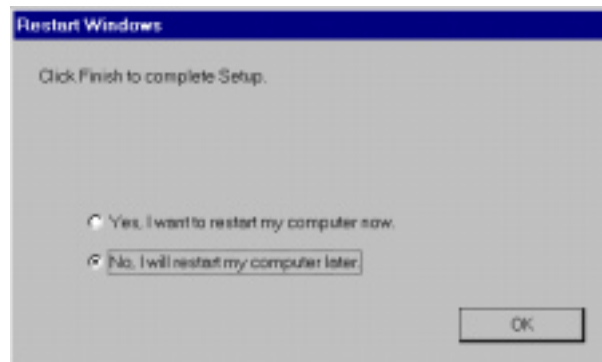
The next screen is simply an acknowledgement that the install went successfully. Click "OK".



A Windows program group screen will appear next and needs to be closed. Simply use the "X" close box in the upper right corner.



Next, InstallShield will ask if you would like to restart your computer. Select **<No, I will restart my computer later>**, and begin the board device driver installation.



2.3 DSP Board Device Driver Installation

3 If you are installing a Development Package which includes an Innovative Integration ISA or PCI-based (plug-in DSP board), you will be prompted to install the device driver for that product now. The Add New Hardware Wizard (Windows 95) or the Software Install (Windows NT) will guide you through the driver installation.

Users of stand-alone DSP boards may skip reading this section of the installation manual since these boards use the serial port device driver. This is already pre-installed in Windows.

Note: Do not attempt to install an Innovative DSP device driver on a PC in which there are no uncommitted (available) interrupts as the device driver may be installed without an assigned interrupt. Pre-inspect the interrupt usage via the Device Manager in Win95 and via NT Diagnostics under NT.

2.3.1 DSP Board Driver Installation: Windows 95

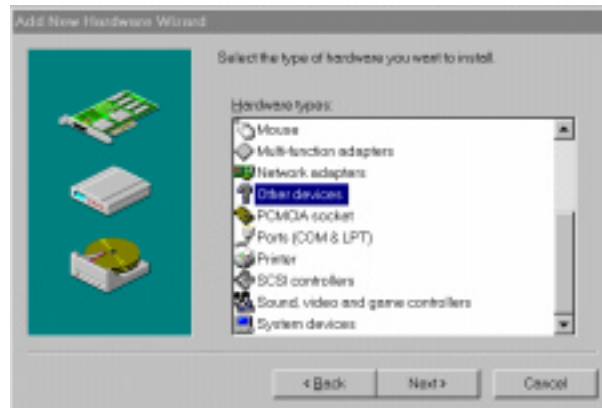
The Add New Hardware Wizard will guide you through the DSP board device driver installation. Select **<Next>** to proceed to the next phase of the hardware driver installation.



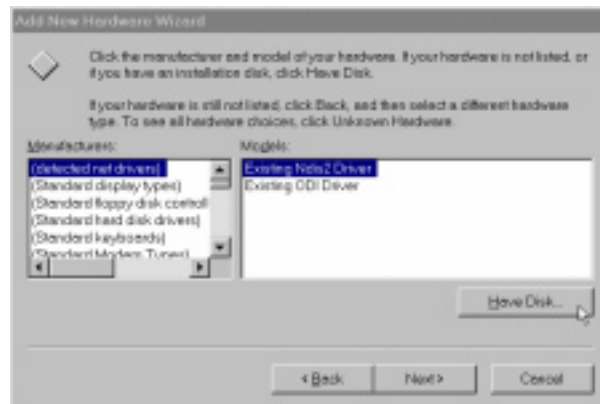
Windows will now ask whether you want it to scan for new hardware installed in your PC. Click **<No>**, and then **<Next>** to proceed:



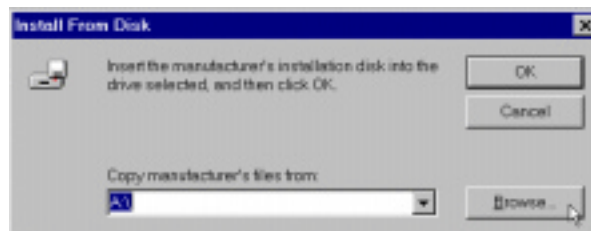
Windows will prompt as to the type of new hardware being installed. Select **<Other Devices>** or **<Other>**, and then **<Next>** to proceed.



Windows will then list the installed drivers. Click on **<Have Disk>** to select the drivers on the CD.

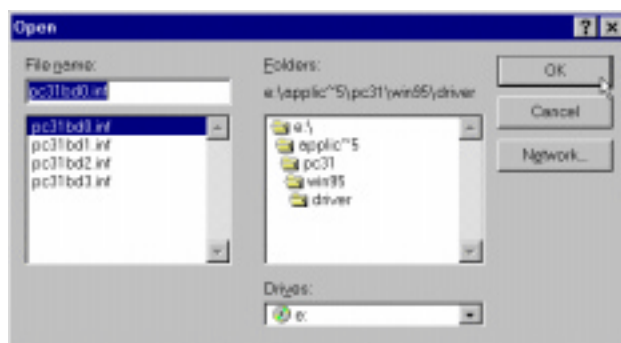


When windows requests a manufacturer's installation disk for the DSP board click on **<Browse>**.

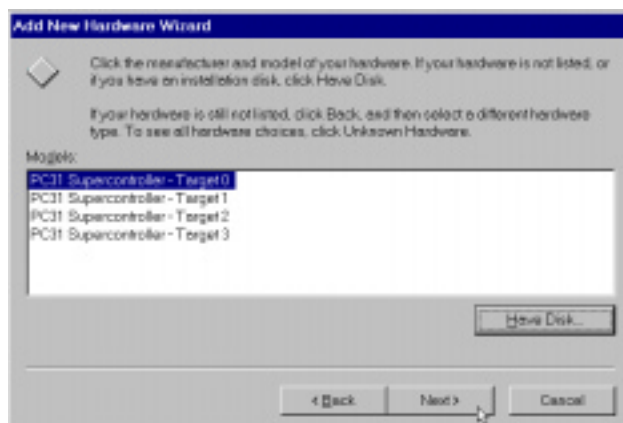


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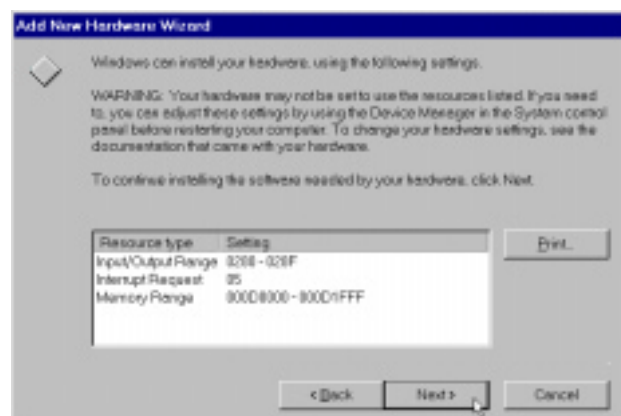
Select the appropriate directory for your computer CD drive plus the following path:
(for example: **E:\<boardname>\win95\driver**), and then click on **<OK>**.



Select the target number that the board will use (Target 0 for one board, Target 1 for second board, etc.) and click on **<Next>**.



If installing an ISA based card, the next dialog box will display the addresses assigned to the DSP board. Users of ISA-bus-based boards (PC31, PC32, PC44, PC50) should make a note of the input/output range, interrupt request, and memory range listed, as it will be needed when configuring the DSP board prior to hardware installation. Stand-alone and PCI based board installations will not show the following dialog box.



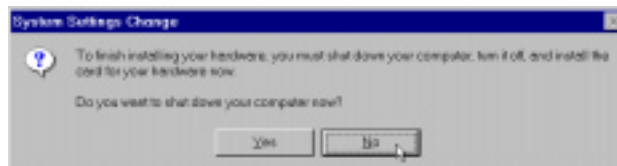
This information can be re-displayed at any time by simply opening the control panel, double-clicking <System> icon, selecting <Device Manager> tab, double clicking the <Other> category, double clicking the appropriate DSP board device name and viewing its <Resources> tab.

Note: After installing a bus-based DSP board, scrutinize the output of the Add New Hardware Wizard to insure that an interrupt was assigned to the DSP board by Windows. If the driver was installed without an assigned interrupt, interrupt-driven application programs (such as the standard SCOPE example) will not work properly.

When finished installing the DSP device drivers, Windows will show the following dialog box.



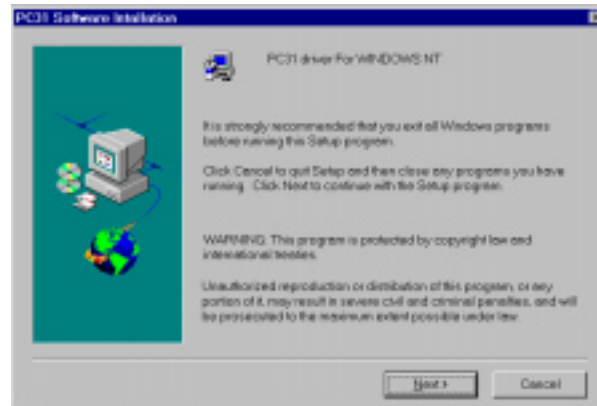
Next, InstallShield will ask if you would like to shut down your computer. Select <No> and begin the JTAG/MPSD debugger driver installation. (Continue reading at section 2.4 for Win95 installation.)



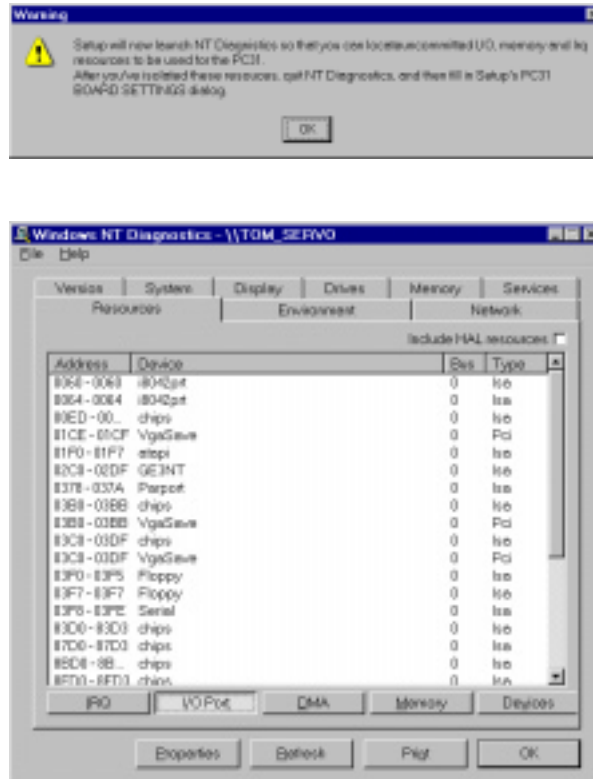
2.3.2 DSP Board Device Driver Installation: Windows NT



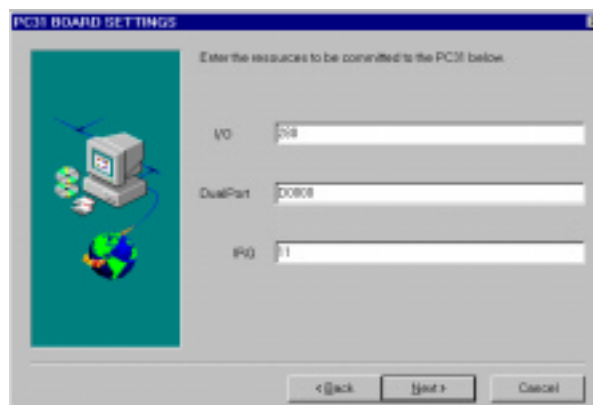
The Windows NT Software Installation will guide you through the DSP board device driver installation. Select **<Next>** to proceed to the next phase of the hardware installation in your PC.



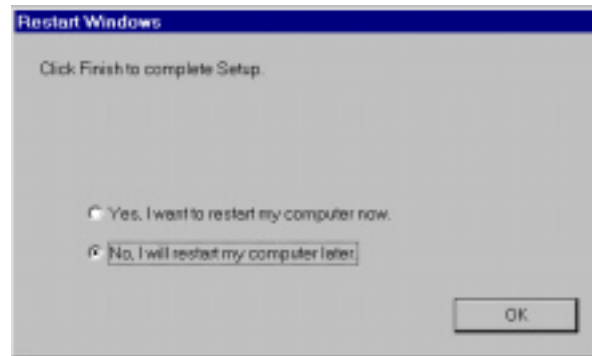
If you are installing an **ISA based board** you will then be prompted to launch NT Diagnostics. Before the Developer's Package software components can be installed, system resources must be set aside to accommodate the debugger board and the DSP card (if you are installing an ISA bus based board). No resources need to be allocated for Innovative's PCI bus or stand-alone DSP cards, as this is done automatically in the software installation. Select the **<Resources>** tab and then click on the **<I/O Port>** button to see all used I/O locations (see figure below). Locate an acceptable range of available I/O addresses for device being installed. Repeat for the IRQ and memory resources. The acceptable I/O and memory addresses can be found on the hardware manual for each device.



The install program will then display the default resource settings. Make sure to change the settings if they conflict with existing devices.



Upon installing the drivers, Windows will ask if you would like to restart your computer. Select **<No>** and then **<OK>** and begin the JTAG/MPSD debugger driver installation



Important, Microsoft Windows NT Users Please Note: The NT Device Driver is configured to start up manually after it is installed. This avoids a potential problem if the driver startup halts the system due to some incompatibility. This would cause NT to halt on start, and if the boot drive has an NTFS file system the lockup could only be solved by reinstalling the OS. The manual install allows a power cycle to restore the original state.

To start the driver manually, after installing the hardware and rebooting, open the NT control panel. Select the applet icon labeled **'Devices'** and open it. Find the driver for the installed board (i.e. ADC64 for the ADC64 board) and select it. To start the driver manually, hit the **'Start'** button.

Assuming that the device started with no problem, the driver can then safely be set to start whenever NT is restarted. To set this, select the **'Startup'** button. In the dialog that opens, select the **'Automatic'** option to load every time, or reset it to **'Manual'** to load the driver only on demand. Do *not* select the 'Boot' or 'System' options, as this is quite likely to lock up your NT system on restart.

2.4 JTAG/MPSD Debugger Driver Installation

Innovative Integration Development Packages include a JTAG/MPSD-based, hardware-assisted C/Assembler Source Debugger called Code Composer. If you are not using Code Composer or have already installed it, please skip this section.

If you have purchased an Innovative Integration hardware-assisted debugger, additional hardware, software and documentation have been included in your shipment. You should have received the following:

Item	Function
JTAG/MPSD debugger board (ISA-bus compatible)	This is the ISA-bus-compatible JTAG/MPSD emulator host interface board which plugs into your PC to allow communication with the target DSP over the JTAG/MPSD scan path.
Target interconnect cable/pod cable	This provides an electrical connection between the host interface board and the target digital signal processor CPU.
Code Composer Debugger package (included on installation CD)	This is the host software, which implements the debugger interface. Custom versions exist for each different DSP family - C2x, C3x, C4x and C5x.

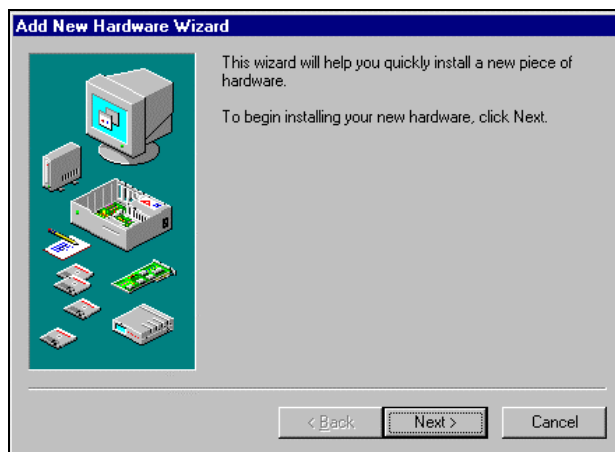
Table 2: Debugger package contents

Installation of the JTAG/MPSD debugger is a three-step process. First, the Windows JTAG/MPSD debugger board device driver is installed. Second, the JTAG/MPSD debugger board is configured and installed in your PC. Finally, the Code Composer debugger software is installed and configured to communicate with the JTAG/MPSD debugger board (this is done during the second phase of software installations).

2.4.1 JTAG/MPSD Debugger Driver Installation: Windows 95



The Add New Hardware Wizard will be started automatically when you select the JTAG device driver installation button of the CD installation program.



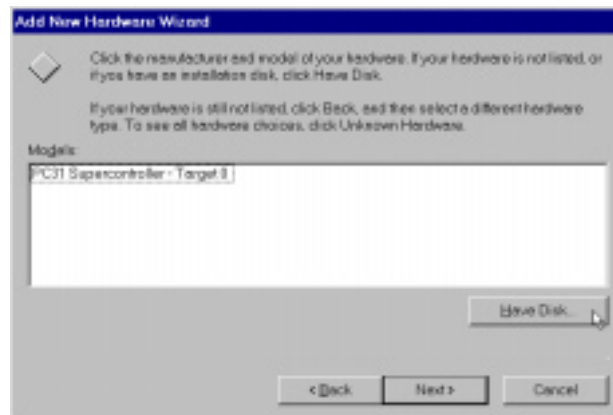
Select **<Next>** to proceed to the next phase of the hardware driver installation. Windows 95 will now ask whether you want it to scan for new hardware installed in your PC. Click **<No>**, and then **<Next>** to proceed:



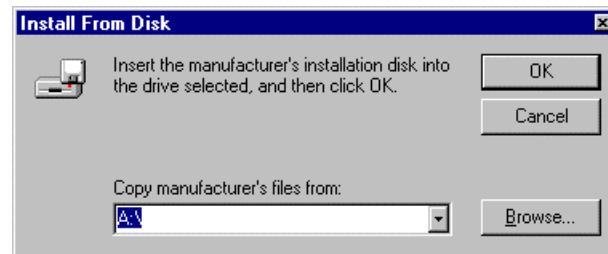
Windows 95 will prompt as to the type of new hardware being installed. Select **<Other>**, and then **<Next>** to proceed.



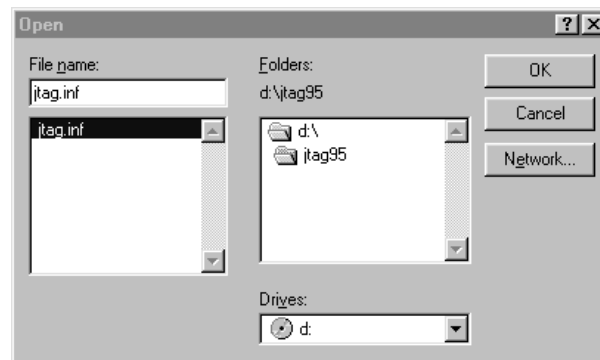
Windows 95 will then list the installed drivers. Click on **<Have Disk>** to select the drivers on the CD.



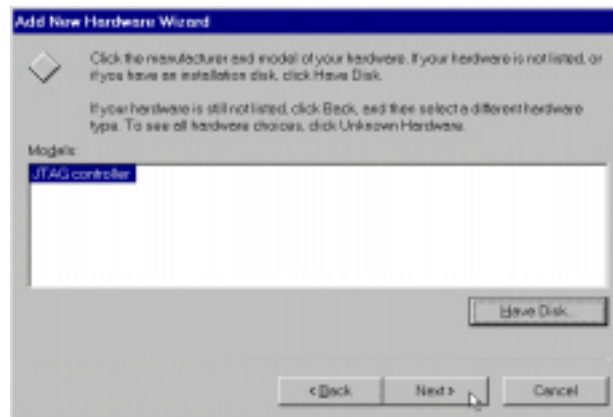
When Windows 95 requests a manufacturer's installation disk for the DSP board click on **<Browse>**.



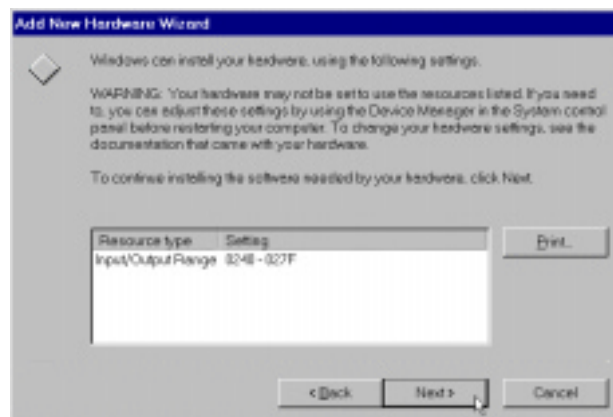
Select the appropriate directory of the installation CD for your computer plus the following path: (**E:\jtag95**), and then click on **<OK>**.



At the dialog box below, select the JTAG device and click on next.



The next dialog box will display the I/O address assigned to the JTAG/MSPD board. Make a note of the address range listed, as it is needed when configuring the emulator prior to JTAG/MPSD hardware installation as well as within the Code Composer Debugger Setup program:



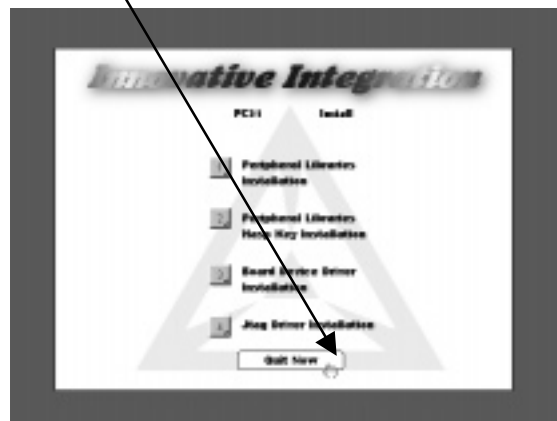
This information can be re-displayed at any time by simply opening the control panel, double-clicking <System> icon, selecting <Device Manager> tab, double clicking the <Other Devices> category, double clicking the JTAG/MPSD controller device and viewing its <Resources> tab.

Windows 95 will install the drivers from the Installation CD. When finished, Windows 95 shows the dialog box below.



Next, InstallShield will ask if you would like to shut down your computer. Select **<NO>**.

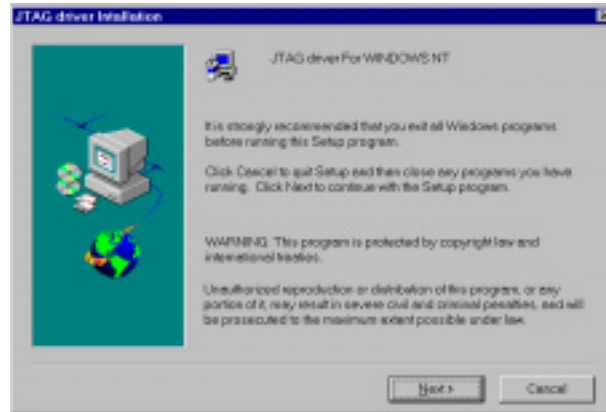
At this point you have finished the software installation process. Upon returning to the installation page, exit with the "Quit" button and go to 3.0 Hardware Installation section. This will exit the CD installation program. At this point remove the CD and shut down your computer to configure and install the hardware. This will conclude the Innovative Integration CD installation.



2.4.2 JTAG/MPSD Debugger Driver Installation: Windows NT

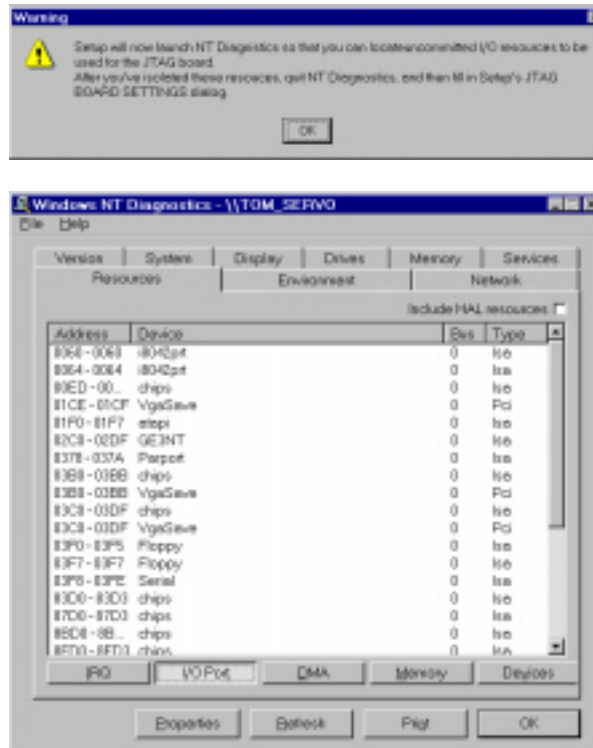


The Windows NT Software Installation will be started automatically when you select the driver installation button in the CD installation program.

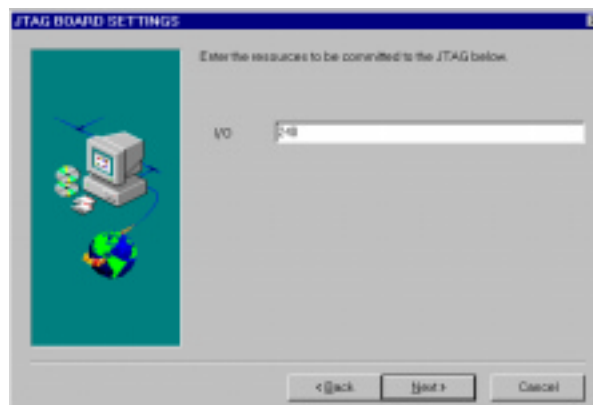


You will then be prompted to launch NT Diagnostics. As with the DSP board device driver installation, select the <Resources> tab and then click on the <I/O Port> button to see all used I/O locations (see figure below). The JTAG board requires 40h bytes of I/O space. The JTAG/MPSD debugger does not require IRQ or memory resources.

Important, Please Note: The installation of the NT Device Driver for the JTAG card requires the installing user to have Administrator rights on the system. This does not have to be the actual Administrator login, as long as the rights are the same.



The install program will then display the default resource settings. Make sure to change the settings if they conflict with existing devices.



Upon installing the drivers, Windows NT will ask if you would like to restart your computer. Select <NO> and then <OK>.

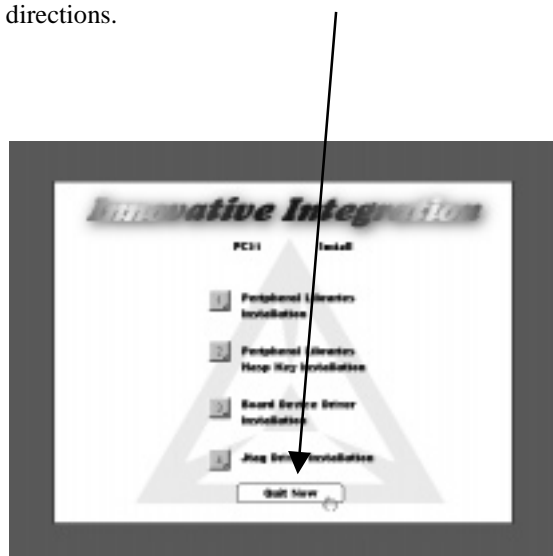


Important, Please Note: The NT Device Driver is configured to start up manually after it is installed. This avoids a potential problem if the driver startup halts the system due to some incompatibility. This would cause NT to halt on start, and if the boot drive has an NTFS file system the lockup could only be solved by reinstalling the OS. The manual install allows a power cycle to restore the original state.

To start the driver manually, after installing the hardware and rebooting, open the NT control panel. Select the applet icon labeled **'Devices'** and open it. Find the driver for the JTAG board (i.e. JTAG) and select it. To start the driver manually, hit the **'Start'** button.

Assuming that the device started with no problem, the driver can then safely be set to start whenever NT is restarted. To set this, select the **'Startup'** button. In the dialog that opens, select the **'Automatic'** option to load every time, or reset it to **'Manual'** to load the driver only on demand. Do *not* select the **'Boot'** or **'System'** options, as this is quite likely to lock up your NT system on restart.

At this point you have finished the software installation process. This will conclude the Innovative Integration CD installation. To shut down your PC and continue with the hardware installation upon returning to the installation page, exit with the "Quit" button and go to 3.0 Hardware Installation section of this manual for further directions.



3. Hardware Installation

Most of the software components of the Development package have been installed. To proceed with the Development Kit installation, it will be necessary to configure and install your hardware.

3.1 JTAG/MPSD Emulator Hardware Installation

First, the emulator hardware must be configured and installed into your PC. There are two types of emulator hardware, described in the table below:

Type	Features
Non-Pod-based	Uses a flat ribbon cable to connect the target DSP emulation signals to the emulator card. Usable on 5 volt designs only.
Pod-based	Uses a special ribbon cable with integrated line drivers to connect the target DSP emulation signals to the JTAG/MPSD debugger card. Usable on 3.3 volt or 5 volt designs.

Follow the directions below, which correspond to the type of emulator board you are using.

3.1.1 Non-Pod-Based Emulator Hardware Installation

Use the following directions to install a non-pod-based emulator card.

If you haven't already done so, shut down Windows and power-off your PC. Set the emulator card's address to the start of the range given by the emulator device driver just installed. The emulator address is adjusted by using a set of switches on the emulator board. The following diagram and table give the appropriate jumper/switch setting for the non-pod-based emulator board.

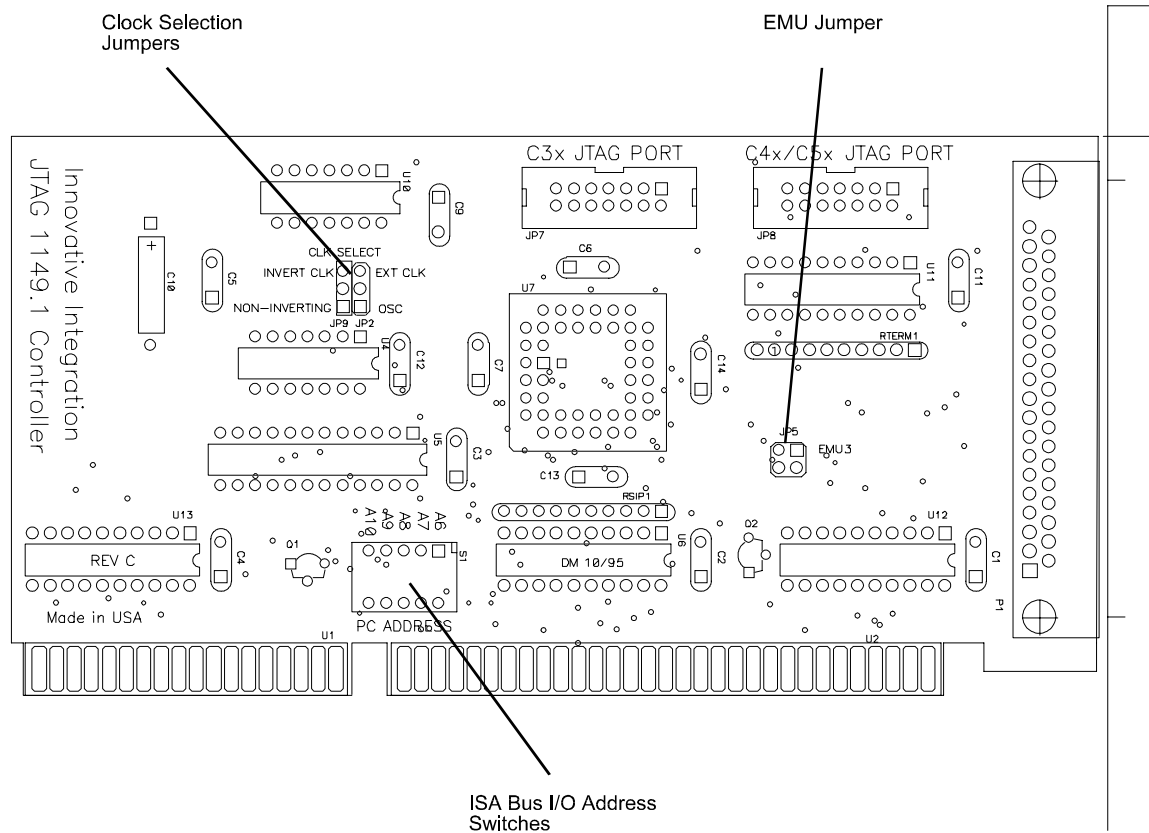


Figure 3: Non-pod based emulator switch/jumper positions

I/O Address	A10	A9	A8	A7	A6
0x100	ON	ON	OFF	ON	ON
0x140	ON	ON	OFF	ON	OFF
0x180	ON	ON	OFF	OFF	ON
0x1C0	ON	ON	OFF	OFF	OFF
0x200	ON	OFF	ON	ON	ON
0x240	ON	OFF	ON	ON	OFF
0x280	ON	OFF	ON	OFF	ON
0x2C0	ON	OFF	ON	OFF	OFF
0x300	ON	OFF	OFF	ON	ON
0x340	ON	OFF	OFF	ON	OFF
0x380	ON	OFF	OFF	OFF	ON
0x3C0	ON	OFF	OFF	OFF	OFF

Table 3: Non-pod-based emulator card I/O address switch settings

Configure the clock select and emulator type jumpers as required for your target board. Use the table below to determine the appropriate settings for your target.

DSP Target Type	Clock Select Setting	EMU Setting
PC31, PC32, PCI32, SBC31, SBC32	NON-INVERTING, EXT CLK	1-2, 3-4
ADC64	INVERT CLK, EXT CLK	1-2, 3-4
PC44, PCI44, PC50	NON-INVERTING, OSC	OFF, OFF

Table 4: Jumper settings for non-pod-based JTAG/MPSD debugger board

Plug the target cable into the appropriate JTAG/MPSD port (C3X port or C4x/C5x port) for your target DSP board. Use the table below to determine the appropriate connector for your target type:

DSP Target Type	Target Connector
PC31, PC32, PCI32, SBC31, SBC32, ADC64	Either C3x port or DB37 with MPSD external target cable
PC44, PCI44, PC50	C4x/C5x port or DB37 with JTAG external target cable

Table 5: Target connector for non-pod-based JTAG/MPSD debugger board

3.1.2 Pod-Based Emulator Installation

Use the following directions to install a pod-based emulator card.

If you haven't already done so, shut down Windows and power-off your PC. Set the emulator card's address to the start of the range given by the emulator device driver just installed. The emulator address is adjusted by using a set of jumpers on the emulator board. The following diagram and table give the appropriate jumper/switch setting for the pod-based emulator board.

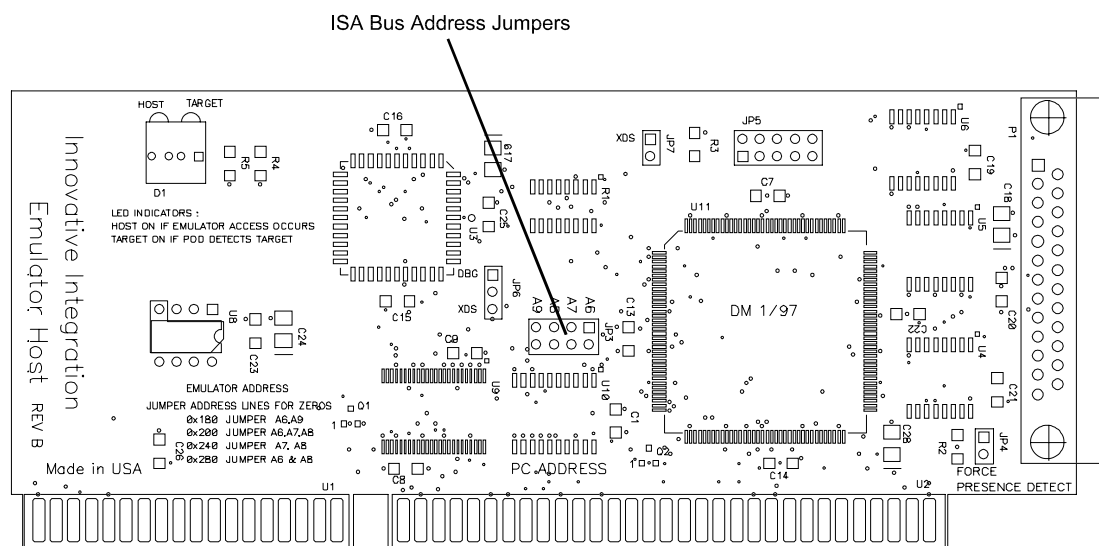


Figure 4: Pod based emulator switch/jumper positions

I/O Address	A9	A8	A7	A6
0x100	ON	OFF	ON	ON
0x140	ON	OFF	ON	OFF
0x180	ON	OFF	OFF	ON
0x1C0	ON	OFF	OFF	OFF
0x200	OFF	ON	ON	ON
0x240	OFF	ON	ON	OFF
0x280	OFF	ON	OFF	ON
0x2C0	OFF	ON	OFF	OFF
0x300	OFF	OFF	ON	ON
0x340	OFF	OFF	ON	OFF
0x380	OFF	OFF	OFF	ON
0x3C0	OFF	OFF	OFF	OFF

Table 6: Pod-based emulator card I/O address switch settings

Once the address is set, install the board in the host computer and connect the pod cable to the external DB25 connector on the end bracket. Plug the pod's target connector into the target DSP card. On JTAG pods, a standard 14-pin connector is provided. On MPSD pods, two connectors are provided: a 14-pin connector compatible with Innovative Integration DSP cards, and a 12-pin Texas Instruments standard connector for all others.

3.2 DSP Board Installation

Innovative Integration makes DSP products that fall into three basic categories. Hardware installation directions are given below for each target card category. When installing the target card:

1. Power off the host system and touch the chassis of the host computer system to dissipate any static charge.
2. Remove the DSP card from its protective static-safe shipping container, being careful to handle the card only by the edges.

Follow the appropriate instructions below to install your DSP board:

Product Category	Products	Installation Instructions
ISA-bus-based	PC31, PC32, PC44, PC50	<p>Refer to the hardware manual for the DSP board to assist you in making the following settings:</p> <ol style="list-style-type: none"> 1. Configure the I/O address of the DSP board to match the I/O address assigned to the board by Windows during the DSP board device driver software installation. 2. Configure the DSP to PC interrupt jumper header to match the interrupt number assigned to the board by Windows during the DSP board device driver software installation. 3. Configure the Dual Port address of the DSP board to match the Memory address assigned to the board by Windows during the DSP board device driver software installation. 4. Install the DSP board into an available 16-bit ISA slot in your PC. 5. Connect the target cable from the JTAG/MPSD board to the DSP board's JTAG/MPSD connector.
PCI-bus-based	ADC64, cADC64, M44, PCI32, PCI44	<ol style="list-style-type: none"> 1. Install the DSP board into an available 32-bit PCI slot in your PC. 2. Connect the target cable from the JTAG/MPSD board to the DSP board's JTAG/MPSD connector.
Stand-alone	SBC31, SBC32, SBC54	<p>Refer to the hardware manual for the DSP board to assist you in making the following settings:</p> <ol style="list-style-type: none"> 1. Place the single-board DSP on a non-conductive work surface and attach the host DSP serial port (hardware manual identifies this port) to an available PC serial port (usually COM1 or COM2) using the supplied 10-conductor serial cable. 2. Connect the triple power-supply supplied in the Development Package to the power connector of the DSP board. 3. Connect the target cable from the JTAG/MPSD board to the DSP board's JTAG/MPSD connector.

Table 7: Categories of Innovative's DSP products

After completing the installation, boot your PC into Windows to proceed with the installation process.

Important, Please Note: MPSD non-pod-based debugger operation is not supported on 'C3x processor boards at processor clock rates above 50 MHz. If the target board order included a 60 MHz upgrade, the board was shipped with an additional 40 MHz clock oscillator part. When JTAG/MPSD debugging is being performed, this part should be used to replace the 60 MHz oscillator populated on the board at the factory. Once software has been debugged using the debugger, the original 60 MHz clock device may be replaced and the target board run at full speed. This limitation applies only to 60 MHz 'C3x boards.

To replace the clock oscillator, power the host system down and locate the oscillator on the target board (the table below gives "U" reference designator numbers for the clock and approximate locations on each

target board). Remove the clock from its socket and orient the replacement part identically according to the following diagram before inserting it into the oscillator socket.

Note: this restriction does NOT apply to pod-based emulators, which are capable of running with processor clock rates up to 60 MHz.

Target Board	Clock Reference Designator	Location
PC32	U37	Next to TMS320C32
PCI32	U37	Next to TMS320C32
SBC32	U37	Next to TMS320C32
ADC64	U61	Between MACH355 and 3XBUS connector

Table 8: Oscillator locations

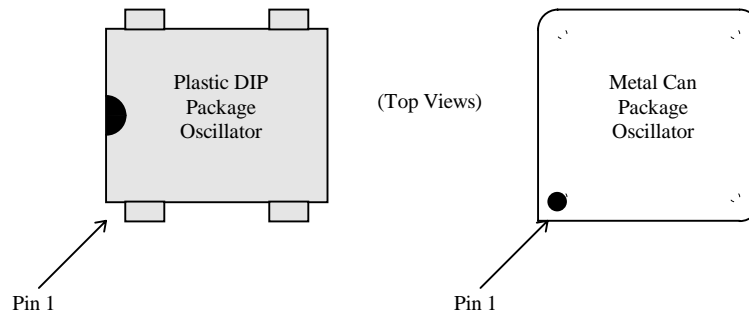


Figure 5: Oscillator package types

Important, 'C3x DSP Users Please Note: By default, the pod-based debugger hardware uses the Texas Instruments standard H3 clock on all MPSD target DSP boards (i.e. those using processors from the 'C3x processor family). Innovative Integration 'C3x DSP boards (with the exception of the ADC64) have a jumper option to use either the H1 or H3 clock on the MPSD connector for backwards compatibility with older debugger hardware. This jumper **MUST** be set to the H3 position whenever a pod-based debugger is in use. Please see the individual card *Hardware Manuals* for information on this jumper setting.

This note does NOT apply to the ADC64, since by default it supplies the H3 clock to its MPSD connector.

3.3 Hasp Key Installation

Install the Hasp Key, provided with your board, into a parallel port now (usually LPT1). Terminal will not run without this key.



Figure 6: Hasp Key

4. Software Installation: Part II

4.1 Go DSP Code Composer

To install the Code Composer software package, follow the installation directions, which came with the Code Composer software package to complete its installation. Basically, this involves running the SETUP.EXE program supplied on disk 1 of the Go DSP-supplied diskettes.

Code Composer requires third party device drivers to be installed along with the executable application in order to support Innovative Integration's debugger hardware. When starting the Code Composer installation, click the Install Third Party Device Drivers button. After the first two Code Composers disks have been installed, the installation program will ask for the Third Party Device Drivers disk. At this point, insert the Innovative Integration Installation CD into your CD drive. Type in the following directory:

E:\composer\32-bit\specific

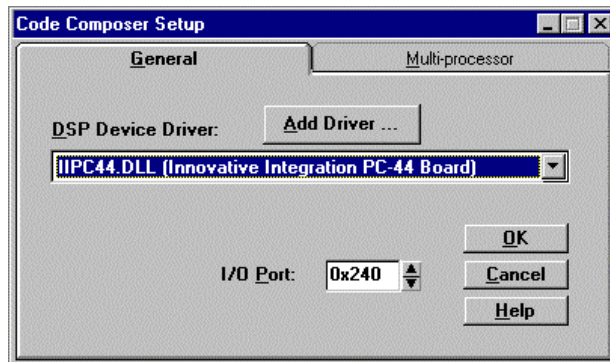
(The "composer\32-bit\generic" sub-directories are for non-Innovative based boards and requires a special version of Code Composer. The composer\16-bit\specific directory is used for versions of Code Composer prior to 3.0)

Click <Continue> and complete the software installation.



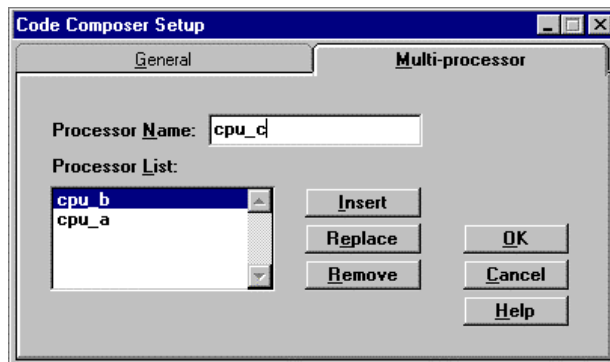
Before running Code Composer, you will need to configure it for use with the Innovative Integration DSP board you have purchased. The Code Composer program group (just created) includes a Setup program which must be run in order to configure Code Composer to properly communicate with the Innovative Integration JTAG/MPSD debugger board. To set up Code Composer, double-click on the Setup Code Composer icon within the Code Composer program group.

The program presents a window showing two tabs: Driver and Multiprocessor:



Select the *DSP Device Driver* tab and select the appropriate driver for the Innovative Integration target card you plan to use. Next, edit the *I/O Port* address field, replacing it with the I/O address assigned to the JTAG/MPSD board by Windows during the JTAG/MPSD debugger driver software installation phase.

If the target is a multiprocessor DSP card (PC44 or PCI44 supercontroller products), select the *Multiprocessor* tab and enter CPU labels for the target hardware in use (see the Code Composer manual for more information on the use of multiprocessor debugging). Please note that the number of processors entered in the scan path list **must** be equal to the actual number of processors in the emulator scan path. Note also that order of the CPU IDs must match the order of the CPU's in the JTAG/MPSD scan path. This is accomplished by entering the identifiers in what appears to be reverse order (with *cpu_b* before *cpu_a* and *cpu_c* before *cpu_b*) in the *Processor List*:



In order for Code Composer to function you must install the Code Composer key onto the parallel port containing the Hasp key. The new key can be plugged directly into the Hasp key.

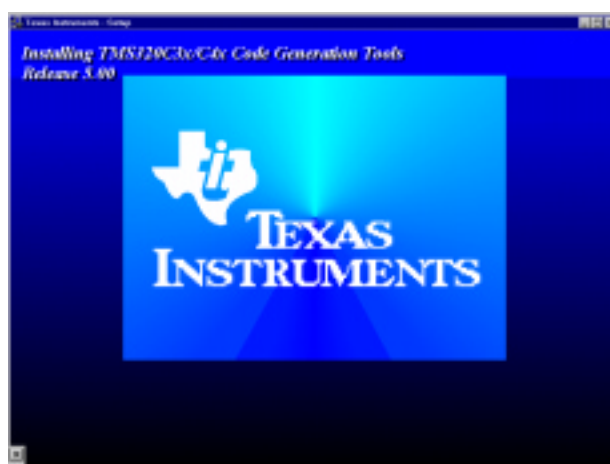
Select OK to save the setup to disk. Code Composer debugger installation is now complete.

4.2 TI C Compiler/Assembler Installation

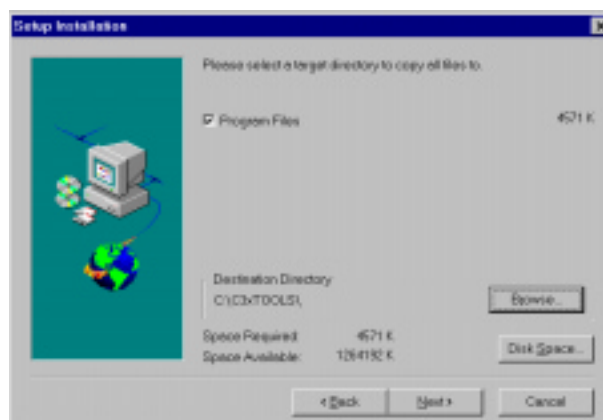
The Texas Instruments C Compiler/Assembler is also included in the Development Package. In order to run Code Composer and other utilities, you will need to customize the installation as explained in this installation. The custom installation consists of three parts:

1. Install TI C Compiler/Assembler software from the CD.
2. Set environment variables. Edit **Autoexec.bat** for Win95 or modify settings under Environment tab of System Icon for WinNT.
3. Expand specified **.SRC** files.

To install the TI C Compiler/Assembler software, start the host operating system and insert the installation CD. Click on the <Start> button, then <Run>. Enter the path to the SETUP.EXE program located at the root of your CD-ROM drive, i.e. **E:\SETUP.EXE**. The setup program will run, starting with a title screen similar to the one below.



During the TI Compiler installation, InstallShield will try to install the compiler in the default C3xTOOLS directory for C3x/C4x targets or C6xTOOLS directory for C6x targets. Use the default C6xTOOLS for C6x targets. However for C3x/C4x targets, Code Composer requires a different directory. When InstallShield prompts you to specify a destination directory, click on <Browse>.

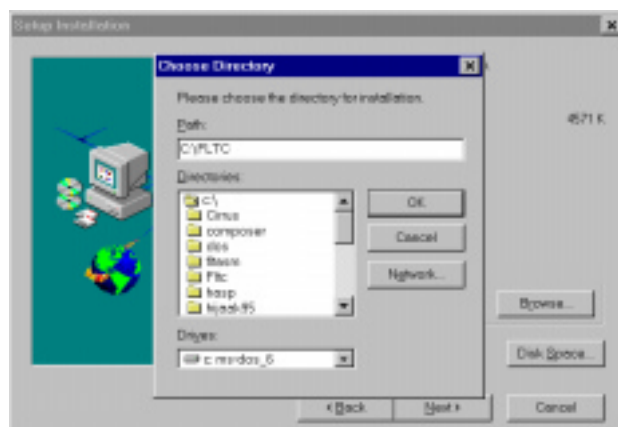


Set the path to the following directory and then continue with the installation as directed:

For TI C Compiler: **C:\FLTC**

or

For TI C Assembler **C:\FLTASM**

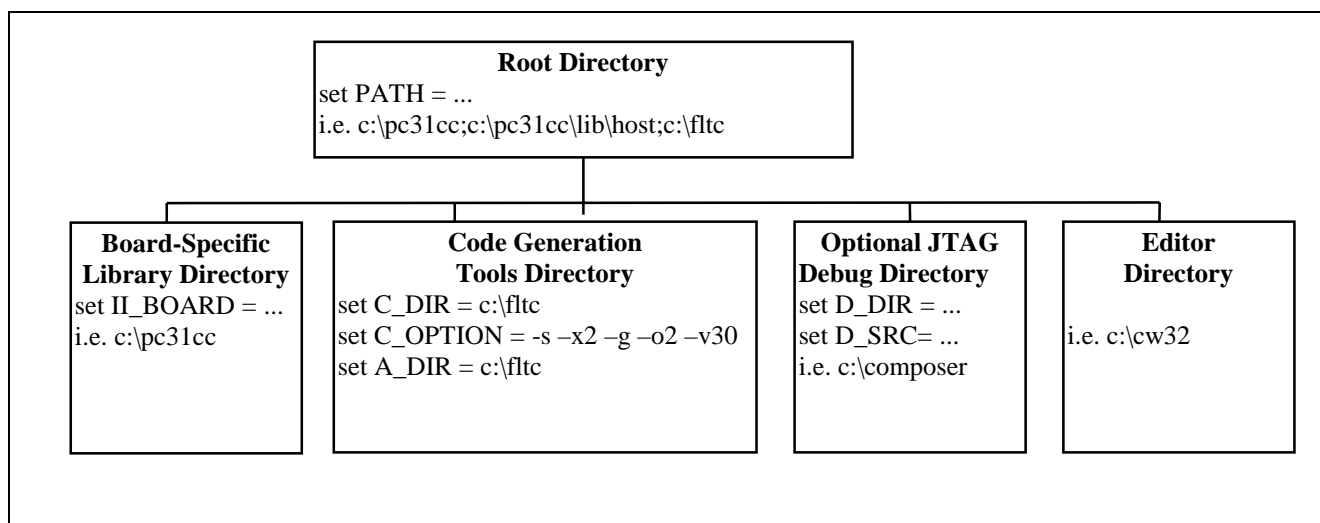


The II Zuma package makes use of DOS environment variables in order to locate header files, code generation executables, etc. Be sure to add/reset the following environment variables after installing the TI code generation tools C Compiler/Assembler. Under Win95, add these variables to your **AUTOEXEC.BAT** file. Under WinNT, add/set these variables by opening Control Panel | System Icon | Environment tab. Note: place all entries under System Variables; not under User variables section. Enter name in Variable: edit box (i.e. ii_board), then enter value of environment variable in Value: edit box (i.e. c:\m62cc). After finish an entry press 'Set' button to add it current settings. Note, unlike Win95, after make changes to environment variable settings they take effect immediately, you do not have to reboot. Note under Win95 that a number of these environment variables may be automatically set when running the **SETUP** program on the distribution disks. However, when upgrading from previous versions or when mixing development components from II and other vendors, problems can arise.

Use the table below to insure that you specify all required environment variables:

DOS Environment Variable Name	Products Affected	Allowable settings
II_BOARD	CodeWright/Peripheral Libraries	Set II_BOARD=<board dir> i.e. set II_BOARD=c:\sbc31cc
DSP_COMPILER	All TI Compilers	Set DSP_COMPILER=<compiler executable directory> 3x/4x: i.e. set dsp_compiler = c:\fltc 6x: i.e. set dsp_compiler = c:\c6xtools\bin
DSP_INCLUDE	All TI C Compilers	Set DSP_INCLUDE=<compiler include dir>;<compiler lib dir> 3x/4x: i.e. set dsp_include = c:\fltc 6x: i.e. set dsp_include = c:\c6xtools\include;c:\c6xtools\lib
C_DIR	All TI C Compilers All II peripheral libraries	Set C_DIR=<target include dir>;<DSP_INCLUDE directory> 3x/4x: i.e. set C_DIR=c:\pc31cc;c:\pc31cc\include\target;c:\fltc 6x: i.e. set C_DIR=c:\m62cc;c:\m62cc\include\target;%dsp_include% *** Specified order is critical! ***
A_DIR (optional)	All TI Assemblers	Set A_DIR=<target include dir>;<assembler include dir>;<assembler library dir>

		i.e. set A_DIR=c:\pc50cc;c:\pc50cc\include\target;c:\fixasm *** Specified order is critical! ***
C_OPTION (optional)	All TI C Compilers	Set C_OPTION=<compiler switches> i.e. set C_OPTION= Note: if using Codewright is set in .mki file.
A_OPTION (optional)	All TI Assemblers	Set A_OPTION=<assembler switches> i.e. set A_OPTION=
D_SRC	All Debugger products	Set D_SRC=<src dir #1>;<src dir #2>;... i.e. set D_SRC=%ii_board%stdio;%ii_board%\dsp;c:\app List all directories containing source code, semi-delimited!
D_DIR	All TI Debuggers	Set D_DIR=<debugger executable dir> i.e. set D_DIR=c:\composer
PATH	All II products All Compilers/Assemblers	Set PATH=%path%;%DSP_COMPILER%;%II_BOARD%;%II_BOARD%\lib\host i.e. set path=%path%;%dsp_compiler%;%ii_board%;%ii_board%\lib\host *** Specified order is critical! ***



Note to TI C3x, C4x and C6x C compiler users:

Since the default TI C Compiler installation does not install all the required files, you will need to go to into **DOS** and manually expand required **.SRC** files.

C3x/C4x TI C Compiler users:

Go to the **C:\FLTC** directory in a **DOS** shell and execute the following 7 commands.

Note: commands are case sensitive.

```

ar30 -x prts30.src
mk30 -v40 --k -o2 -mn prts40.src
ar30 -x prts40.src compt40.h
ar30 -x prts40.src dma40.h
ar30 -x prts40.src intpt40.h
ar30 -x prts40.src mulpro40.h
ar30 -x prts40.src timer40.h
  
```

C6x TI C Compiler Users:

Perform the following operations only if your version of the C6x compiler does NOT already contain the runtime library files named devlib6x?? .lib within the C6xTOOLS\LIB directory.

Use Windows Explorer to copy devlib6x.zip from the \m62cc\source directory into
\C6xtools\lib

Use Windows Explorer to copy `extract.bat` from the `\m62cc\source` directory into `\C6xtools\Include`

Use `WinZip.EXE` or `Pkunzip.EXE` to extract `devlib6xe.lib` and `devlib6xle.lib` from the archive into the `\C6xtools\lib` directory.

Double click on the `extract.bat` file within the `\C6xtools\Include` directory to extract the C6x runtime library header files (`dma.h`, `intr.h`, `mcbasp.h`, `timer.h`, `emif.h`, `cache.h`, `regs.h` and `hpi.h`).

The TI C Compiler installation is now complete.

5. Testing the Development Package Installation

At this point, all of the core software and hardware elements of the Development Package have been installed. Follow the instructions below to test your installation.

5.1 Configuring the Applets within the Development Package

Each of the Development Packages is supplied with several, standard Windows applets, which are used to perform common functions with the DSP board. These standard applets include:

Applet	Function
DOWNLOAD.EXE	Application to download a debugged DSP application to a DSP target board without using JTAG/MPSD debugger.
TERMINAL.EXE	Application to act as a terminal emulator to standard I/O requests posted by the target DSP board during target executing.
COFFDUMP.EXE	Application to display memory usage of target executables.
BURN.EXE	Application to support burning application code and Talker code into FLASH ROM on FLASH-based DSP products.

Table 9: Host support applications

These applets are located in the root of the board-specific peripheral libraries and may be accessed using the Explorer or by right-clicking the <Start> button, clicking <Open>, double-clicking <Start Menu> and double-clicking (opening) the Folder associated with the DSP board. This should open a window containing icons similar to the following:



The target applets are configured by simply double-clicking the applet from within the program group, and running it. This creates a .INI data file that contains the configuration information for the applet. If necessary, this .INI file can be editing (using Notepad or a text editor) to modify parameters as required.

For example, you may need to modify the Target Number of the DSP board. This is simply a handle to a DSP device used by the Windows DLL and should be zero unless you are using more than one DSP in your PC at a time.

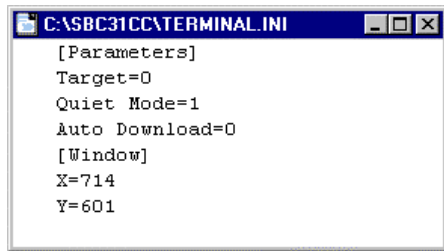


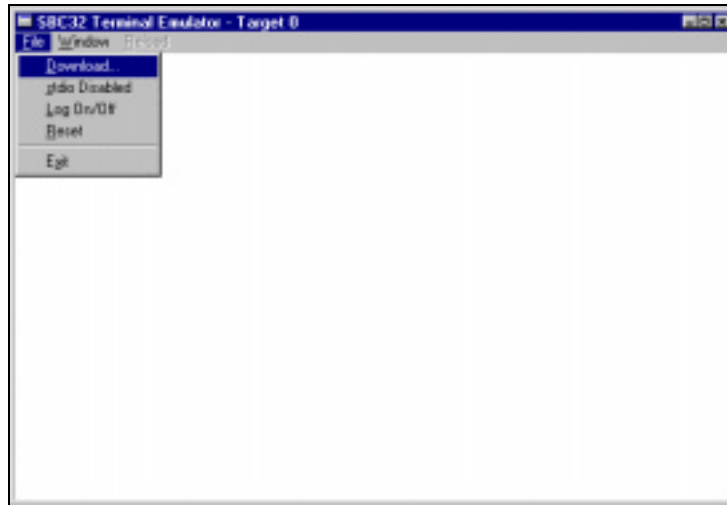
Figure 7: .INI file parameters

On single-board DSP's, target zero refers to serial port COM1 and target one refers to serial port COM2, etc.

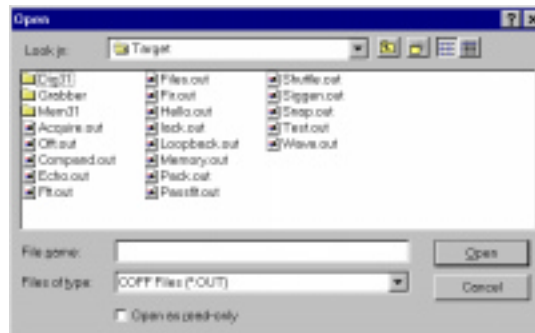
5.2 Running an Example Program using TERMINAL

Each of the Development Packages is supplied with a terminal emulator application which can be used either stand-alone or in conjunction with Code Composer. The terminal emulator application is a small, Windows applet, which acts as a receptacle for standard I/O requests generated by a target DSP application. Refer to the Software Manual for your DSP board for detailed information on the terminal emulator.

Invoke the TERMINAL utility now. You should see a window similar to the following:



Select **<Download>** from the **<File>** menu, to begin downloading a program to the target DSP. This will open a dialog box from which you can select a target DSP program to run. The examples can be found in the **c:\<board directory>\examples\target** directory:



Select **HELLO.OUT** from the file list and click **<Open>** to download and run the classic “Hello World!” program to the target DSP.

The terminal emulator should display “Hello World!”, as shown below:



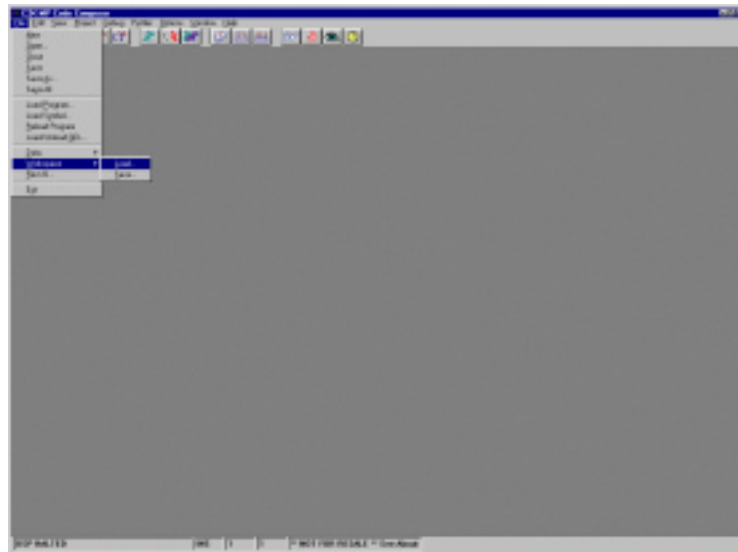
If so, proceed to Code Composer Testing, below. Otherwise, refer to the Troubleshooting section at the end of this document for frequently asked questions and solutions.

5.3 Testing the Code Composer Debugger

First, open the TERMINAL program for the DSP target from the DSP group on the desktop. Next, open the Code Composer folder by right-clicking the **<Start>** button, clicking **<Open>**, double clicking **<Start Menu>**, and double clicking (opening) the Code Composer folder. This should open a window containing icons similar to the following:



Double-click on the Code Composer icon to launch the debugger. You should see a window similar to the following:



If so, load and run the HELLO.OUT target application as described below. Otherwise, refer to the Troubleshooting section at the end of this document for frequently asked questions and solutions.

Select Run Free from the Code Composer Debug menu. The DSP target application should run, displaying “Hello World!” In the terminal window:



You have successfully run your first DSP program from within the Code Composer C Source Debugger environment! Refer to the Code Composer documentation for complete instructions on how to exploit all of the features within the debugger.

Installation is now complete.

6. Troubleshooting

This section includes answers to commonly asked question relevant to installation and initial testing.

Question	Answer
I already had a licensed copy of the TI tools , so I omitted them from the Development Package. Whenever I attempt to compile, assemble or link a program from within Code Composer, the build window shows “Bad command or filename” errors.	Edit your AUTOEXEC.BAT file to add the directory containing your TI toolset to your default path, i.e.: path = c:\windows;c:\windows\system;c:\fltc
When I attempt to start Code Composer, my PC “hangs” and won’t respond to the mouse or keyboard.	<ol style="list-style-type: none"> 1. If you are using a C3x-based DSP board, insure that the JTAG/MPSD cable is properly connected between the debugger board’s C3x JTAG/MPSD connector and the target DSP board’s JTAG/MPSD connector. 2. For all other targets, insure that the JTAG/MPSD board clock select is configured for OSC and that the on-board oscillator is seated in its socket.
Code Composer won’t start. It shows a dialog box that says “Can’t initialize target DSP. Trouble with JTAG/MPSD controller. Please insure the I/O port is set properly”	<p>There are several common reasons for this error. Verify each of the following:</p> <ol style="list-style-type: none"> 1. You have properly configured the JTAG/MPSD debugger board according to the I/O assignment produced by Windows during the JTAG/MPSD device driver installation and that all jumpers are properly oriented for communication with your target. 2. Your JTAG/MPSD cable is properly connected to the DSP target board. 3. ISA DSP board users: Verify that you have properly configured the DSP target board according to the I/O and interrupt assignments produced by Windows during the DSP board device driver installation. 4. Stand-alone DSP board users: Verify that the DSP board is powered up and that the supply voltages are correct. If you are using a serial mouse, change the target number setting in the terminal.ini file (found in the board’s root directory). 5. You may have selected the incorrect driver for your DSP target within the Code Composer setup utility. If you are using a multiprocessor target, check the multiprocessor settings as well. 6. When using the non-pod-based debugger on 60-MHz ‘C3x target boards, make sure that the clock oscillator has been replaced with the supplied 40 MHz device while Code Composer is in use. 7. When using the pod-based debugger with an MPSD pod, make sure the target is set up to provide the ‘C3x H3 clock (see DSP card <i>Hardware Manual</i> for details).
I have checked and re-checked the settings for my JTAG/MPSD board and it’s connections to the DSP target, but Code Composer still won’t start.	The ISA card edge connector on the JTAG/MPSD board may be dirty. Clean the ISA card edge connectors for the JTAG/MPSD board using a pencil eraser until the edge connector is free of residue and film.
I can’t seem to load any of the Code Composer workspaces for the Development Package example programs.	The project workspaces (*.WSP files) were created for proper execution when the DSP board directory exists on the C:\ drive. If you installed your DSP board directory onto another drive, you will have to recreate each of the project workspaces. However, it is possible to edit each of the project make files (*.MAK), modifying all drive letter designators in order to allow them to work on another drive.
Code Composer appears to operate properly (I can load, execute and step through programs), but standard I/O doesn’t appear on my terminal window when I run the example programs.	Insure that the TERMINAL applet is configured to communicate with your target board. For single-board users, the target number corresponds to the PC com port being used (target 0 = COM1, target 1 = COM2, etc). For all other targets, the target number is usually zero. You may need to edit the applets .INI file (using Notepad) in order to manually adjust the target number. The .INI file is located in the II_BOARD directory.
I have installed a PCI-based DSP card and now my PC won’t boot.	You do not have an available, uncommitted IRQ for use by the PCI card. Enter the system BIOS setup and reserve an IRQ for use by the DSP board

Question	Answer
I have installed a PCI-based DSP card and my PC boots. But an ISA adapter card in my system (network card, etc), which used to work fine, is no longer operating.	The PCI BIOS has assigned the DSP board an IRQ that was already in use by the ISA board. Enter the system BIOS and reserve an IRQ for use by the DSP board.
Our host application is not Windows-based. We're using DOS, UNIX, OS9, etc for our host environment. How can I develop and debug my target application?	Install Code Composer and the TI tools onto a Windows-based PC and umbilical over to the DSP board installed in a second machine that is running under the "foreign" operating system. You will not be able to run TERMINAL and DOWNLOAD under the foreign OS, but the Windows-based system can be used to develop and deliver code to the target DSP over the JTAG/MPSD link.
I get a "Talker didn't start!" message when attempting to download to my single-board DSP from within TERMINAL or DOWNLOAD.	Insure that the applet is configured to communicate with your target board. For single-board users, the target number corresponds to the PC com port being used (target 0 = COM1, target 1 = COM2, etc). For all other targets, the target number is usually zero. You may need to edit the applets .INI file (using Notepad) in order to manually adjust the target number. The .INI file is located in the TI_BOARD directory.
We are planning to use Visual Basic for our host application. Can I access your host DLL functions?	Yes, the DLL functions are accessible with this tool.
After installing a stand-alone board, my serial mouse no longer works.	Terminal is using the same target number as your mouse (target 0 = COM1, target 1 = COM2, etc). Change the target number setting in the TERMINAL .INI file in the board's directory.
After installing a stand-alone board, my computer won't reboot, I get a keyboard error at boot up, or Windows hangs at start up.	Your DSP may be stuck in a bad state. Turn off your computer. Remove power to the board. Turn on your computer and wait for windows to boot (if prompted to start in safe mode, ignore the message and do a normal boot). Once windows has started, power up the board.
I have downloaded a new driver for my board from you FTP site. How should I install it?	Rerun the driver installation as documented earlier in this document. Your old driver will be overwritten during the installation.